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SOME CONSIDERATIONS

ON THE DIFFERENT WAYS OF

Removing confined and infectious Air;

AND

THE MEANS ADOPTED,

WITH

REMARKS ON THE CONTAGION,

IN

MAIDSTONE GAOL.

By THOMAS DAY, Surgeon.

K 1-3 56

TO WHICH IS ADDED

AN APPENDIX, 1-7

Containing some Experiments on Ventilating small sitting Rooms, and preventing Chimneys from Smoking.

MAIDSTONE:

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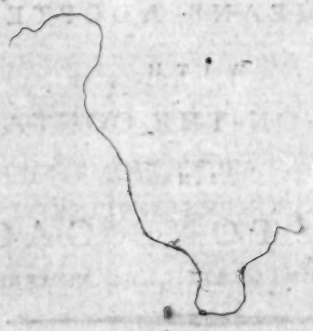

TO THE

Worſhipful the Juſtices of the Peace,

FOR THE

WESTERN DIVISION OF THE COUNTY OF KENT,

WHOSE HUMANE POLICY

IN

THE PRESENT ENLARGEMENT OF THE COUNTY GAOL,

AND

WHOSE CONSTANT ATTENTION TO THE HEALTH OF THE PRISONERS CONFINED IN IT,

DESERVE THE MOST GRATEFUL ACKNOWLEDGMENTS.

THE FOLLOWING CONSIDERATIONS,

ARE RESPECTFULLY

INSCRIBED BY,

THEIR MOST OBEDIENT,

HUMBLE SERVANT,

THOMAS DAY.

MAIDSTONE,
OCT. 28, 1784.

ERRATA.

Page 2, line 16, For diſpair, *read* deſpair.
—— 16, —— 7, For currupt, *read* corrupt.
—— 17, —— 17, For conſiſtant, *read* conſiſtent.
—— 35, —— 9, For rarify, *read* rarefy.
—— 43, line the laſt, For Bobert, *read* Robert.
—— 49, —— 2, For peculiar, *read* peculiarly.

INTRODUCTION.

In compliance with the requeſt of ſeveral gentlemen, I have put together ſome proceedings relative to the removal of the infection that appeared in Maidſtone priſon, laſt winter; and the preceding ſummer.

Moſt of the means adopted for that purpoſe were ſuch as are generally known and practiſed in ſuch caſes by medical people in general; yet part of thoſe means I may venture to ſay (as far as I can learn) was new and had not been put in practice before. Alſo, ſome part of the other proceedings were altered from the uſual manner of application.

Were my abilities equal to the taſk, my time from my profeſſional line is too much interrupted to admit of my writing as an author; yet, as I conceived that ſuch part of the means, as ſeemed to have the moſt ſpeedy effect in removing the infection, was the conſequence of what I had propoſed, particularly the ſhower machine, in

inhabited

inhabited places, where the boiling lime could not be uſed. I thought it no more than juſtice to myſelf, and the world in general to make it public; by which means, not only rooms, and all places of confinement, where the air may be fouled, in this neighbourhood, or even in this country; may be cleared and rendered ſafe, but alſo in other parts of the world at a greater diſtance.

And although the uſe of the ſhower machine alone, may not always anſwer the effect, of entirely purifying infected and confined air; yet, I hope, from the apparent ſucceſs that followed its application here; it may be at leaſt numbered amongſt the uſeful and eaſy means for effecting ſuch deſirable purpoſes.

Perſons concerned in keeping and ſuperintending ſuch places, will reflect with themſelves, how far my obſervations correſpond with their own ideas; and will adopt them accordingly, that they may render ſuch ſervices a bleſſing to mankind in general.

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The importance of conſiderations of this kind, which ſeem to be ſuggeſted for the good of mankind; and in particular for that part of them, who, under the ſtricteſt confinement, have the leaſt opportunity of relief; ſome of whom may, and often are found to be innocent; will, I hope, apologize for the many inaccuracies that may be found in the following ſheets; which may have eſcaped my obſervation.

A committee was appointed to collect a ſubſcription, and to diſtribute the collection for the uſe of the priſoners, on ſuch neceſſaries as were thought moſt requiſite; and a ſmall ſum reſerved for the diſcharged priſoners to bear their expences home, that they might not be tempted, for want of money, to repeat a crime for which they had ſo lately been confined.

The ſubſcription began in Maidſtone, and was liberally ſupported by the principal gentlemen and ladies of this county, 'till a ſum of *three hundred* and *fifty-one Pounds ten ſhillings* and *four-pence* was collected.

SOME CONSIDERATIONS ON THE DIFFERENT WAYS OF REMOVING CONFINED AND INFECTIOUS AIR.

THE contagious fever in the priſon of this town during the laſt winter, was an object of attention, not only to the committee appointed for the relief of the priſoners, but to the inhabitants of the town, and county in general. In the months of January and February the fever proved ſo infectious and obſtinate, that it was ſuppoſed, that this priſon was more particularly hazardous and alarming to thoſe who had the buſineſs of it to attend, than any other county priſon; although it had been duly viſited, ſituated in a healthy airy ſpot, and not the moſt incommodious: But having lately peruſed a pamphlet, publiſhed by Sir GEORGE PAUL, *on the defects of priſons*, where

there is frequent mention made of the diſtreſs and miſery brought on the priſoners in Gloceſter gaol, from fevers induced by confinement, the want of cleanlineſs, and proper accommodations neceſſary to ſupport life and prevent diſeaſe: It appears from it, that other priſons have been ſubject to like misfortunes with that in this town.

While ſuch fevers rage in a priſon, no perſon is ſafe who is obliged to attend it.

Debtors for very trifling ſums, and priſoners put in under very ſlight, and ſometimes ill-founded charges, are equally liable to the infection; and as Sir GEORGE mentions, "It frequently happens "that the verdict of our honourable acquittal is "announced to a wretch expiring in agonies of "peſtilential diſeaſe, or ſo reduced, by hunger and "diſpair, that the freedom we award him is be-"come a thankleſs boon."

The ſame gentleman obſerves, by way of proof of what he adduces, that, "at the laſt aſſizes "(in Gloceſter) eleven bills were found againſt "priſoners in ſuch a bad ſtate of health that they

"could

" could not take their trials; and it is a fact, that " two priſoners were expiring, whilſt the grand " jury were examining their indictments, and " were actually dead before the bills were returned " to court." In another place Sir GEORGE mentions " during the laſt ten months, fourteen " priſoners have died of the ſmall pox, and gaol " diſtemper, of whom ſeven were perſons uncon- " victed of any crime.—Three were fines.—Three " debtors.—And one convict."

The ſame gentleman when treating of the hard-ſhips of certain deſcriptions of priſoners mentions that the gaol fever " is ſometimes the eventual " puniſhment for baſtardy; for ſnaring a hair; " for avoiding a turnpike; for ſelling a pint of " ale. That three perſons under this deſcription " have actually died of the diſtemper within the " laſt eight months."

The military and naval ſervice is in danger of ſuffering by ſuch diſeaſes, and have ſuffered much in times paſt.—Sir GEORGE mentions his be-ing authentically informed by an officer in the war before laſt, that a regiment of ſeven hundred men

was raiſed for the Weſt India ſervice; many of the men being taken from priſons; and that the gaol fever broke out among them after their embarkation, and only forty men of the whole regiment arrived at the deſtined port. Doctor LYND, in *his Eſſay on the health of Seamen*, aſſerts "that "the ſource of infection to our fleets and armies, "are undoubtedly, our jails. The firſt Engliſh "fleet ſent laſt war to America loſt by it two "thouſand men." In this particular the countries on the continent, have remarkably the advantage of this iſland, as Mr. HOWARD obſerves, that "the gaol diſtemper is not known in the priſons "abroad."

The great danger that the judges and other gentlemen concerned, are liable to, as well as the ſpectators, who are always numerous at trials, is evident from the hiſtory of the dangerous effects of trying priſoners when ſo infected. In the year 1577, at the aſſizes at Oxford, which is called *the Black Aſſize* from its fatal conſequences; "all who "were preſent died in forty-eight hours, the judge, "the ſheriff, and about three hundred others." (Baker's Chronicle, p. 853.)

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At Taunton in 1730, ſome priſoners infected the court, and the judges, the ſheriff, a ſerjeant, and ſome hundred others died. The hiſtory of the melancholy affair of the Old Bailey in 1750 is ſtill freſh in the memory of hundreds, where it is mentioned that "many people who were in the "court, were ſenſibly affected with a very noiſom "ſmell. Within a week after the ſeſſions, many "were ſeized with a fever of a malignant kind, "and few who were ſeized recovered. The per-"ſons who died, were Sir Samuel Penant, lord "mayor, the two judges, Sir Thomas Abdey of "the Common Pleas, and Mr. Clerk, a baron of "the Exchequer; Sir Daniel Lambert, alderman; "a gentleman of the bar; the under ſheriff; "ſeveral of the jury; and about forty others." (Foſter 74.)

Sir GEORGE PAUL obſerves that Mr. HOWARD has computed that many more are deſtroyed by the gaol fever than by executions in this kingdom: And the calculation holds very ſtrongly in Gloceſter-ſhire; where, it appears that of late the proportion has been as three dead of the diſtemper to one executed. The proportion has not been ſo great

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at the aſſizes in Maidſtone, as out of one hundred and ſix felons, ſeven were executed, and fourteen died of the diſtemper.

There are many diſtreſſing conſequences attending the gaol fever: Not only the friends of thoſe who are ill in priſon on coming to viſit them are frequently ſeized with it and die; but they communicate it to others; alſo, priſoners diſcharged after trial convey the infection to others, and often die of it themſelves, after they are acquitted. Mr. HOWARD obſerves that "at Axminſter in 1755, "a priſoner diſcharged from Exeter gaol infected "the whole family with the gaol diſeaſe, of which "two died; and many others in the town." Sir GEORGE PAUL mentions. "At the ſpring aſſize, "bills were found againſt eleven priſoners, who, "ſuffering at that time under the gaol diſeaſe, "were deprived of the benefit of the ſacred privi- "lege of their *habeas-corpus*. Of theſe eleven per- "ſons thus extrajudicially ſentenced to a further "ſix months captivity, (under circumſtances above "deſcribed) three died without trial, four on trial "were found innocent, and four only convicted. "There are now ſeveral priſoners who are on the

"point

" point of death without trial. Ten have died of " the ſmall pox within the laſt five months, beſides " the number unknown, to whom it has been " doubtleſs communicated by priſoners returning " to their families. So fatal, indeed, is this diſ- " eaſe known to be, (when under priſon attention) " that, it is a known fact, proſecutors have neglect- " ed the proceedings for a trial, conſidering their " buſineſs as compleated in a ſummary way, on " hearing that their culprit was ſick in priſon." Many diſtreſſing caſes of this nature are related by Mr. HOWARD and Sir GEORGE PAUL, one in particular I ſhall tranſcribe.

" Joſeph Beard, (a cripple) and the wife of " John Witts, of the pariſh of Stroud; having " been preſent at a trifling affray, were, with many " others, indicted for a riot. On their appearance " for trial the matter was accommodated; but they " (ignorant of the conſequences) left the court with- " out diſcharging their recognizance. In due " courſe of proceedings, their names were reported " as eſcheated to the Exchequer, a writ in conſe- " quence iſſued, and Beard, and Witts, the huſband " (as anſwerable for the wife) were committed to

" priſon.

" priſon. Beard immediately caught the ſmall " pox, and on his recovery was ſeized with the gaol " fever, and, after lingering ſeveral weeks, died; " Witts at the point of death with the ſame diſor- " der, was carried home to his family, and now " lies delirious, without hope of recovery."

In another part of the ſame tract, after having ſpoken of the diſeaſes of the priſon, Sir GEORGE mentions, " convinced that theſe miſerable effects " could not be confined within the walls of the " priſon, I made enquiry into the more remote " conſequences, and I found that within a ſpace of " four miles round my own houſe, three debtors, " one poacher, and a fine, had actually died with- " in the preceding ten days, of a fever brought " from the priſon: And that of eight other per- " ſons infected by them, one is ſince dead, and " ſeven lie dangerouſly ill."

Theſe are only ſome of the quotations which might be taken from Sir GEORGE PAUL's pamphlet of the defects of priſons, and the fatal conſequences of the gaol fever, both in priſons and in country places, to which the infection is carried by priſon-

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ers diſcharged: Nor was the infectious fever confined within the limits of the priſon at Maidſtone, but was in the ſame manner, carried into the country by priſoners ſet at liberty.

E. G. Diſcharged at the quarter-ſeſſions, went to Town-Malling, about ſix miles diſtant; and was there taken dangerouſly ill of *the gaol diſtemper*, and died; although every attention poſſible was paid him by the medical gentlemen of that town. The beadle, John Fowler, who attended him more frequently than any other perſon, caught the ſame fever, and recovered, after having lain in a very dangerous condition for a long time. Robert Fowler, hair-dreſſer, received the infection from the deceaſed, and died. James Palmer was one of the perſons who frequently viſited the poor deceaſed priſoner, he was alſo taken with the fever and died. Mrs. Field, who from motives of humanity attended the deceaſed in his illneſs; caught the fever but recovered; as did likewiſe a ſervant man.

William Edmunds, a debtor, diſcharged, went to his home at Bredhurſt, and there fell ill of the fever, and died.

——— Martin, of Tovil, frequently viſited his brother while he lay dangerouſly ill of the fever in the priſon; he alſo was taken with it, and died.

A publican's boy carrying beer to the priſoners in the pound of the court-hall, at the quarter-ſeſſions, caught the fever, and recovered:—And nothing is more evident, than that the priſons in moſt parts of England, are in effect rather places of execution than places of confinement for trial.

It was not imagined here, that the gaol diſtemper was ſo general as it appears to be from Sir GEORGE PAUL's obſervations; one of which is the following, "It has been demonſtrated in the "inſtance of a particular county, that, notwith-"ſtanding every attention of the gaoler to his "duty, its priſons are the ſources from whence diſ-"eaſe, peſtilence, and infamy, are diffuſed thro.gh "the county, that they are oppreſſive to the unfor-"tunate; and incompetent to the puniſhment of the "vicious;—we have the undeniable evidence of "Mr. HOWARD's Reports, that theſe *defects* are "not peculiar to any one diſtrict; the enormous "exceſſes that daily encreaſe through the king-

"dom

" dom are ſufficient indications that the conſe-
" quences are *univerſal.*"

Sir GEORGE PAUL, in a very humane and generous manner proceeds to conſider the great difference there is between the priſons in England, and in moſt countries on the continent; and how far every good member of ſociety, but particularly the magiſtrates are, in honor to their country and in the duty they owe to mankind, bound, to inſpect into the condition of the priſoners of every gaol in their neighbourhood; and the more to inforce their duty quotes a law paſſed directly requiring the ſteady execution of ſuch duties. As Sir GEORGE's book may not come into the hands of every one in this part of the country, I ſhall tranſcribe that part of the law therein taken notice of.

By 14 GEO. 3. c. 59. " Whereas the malig-
" nant fever, commonly called the gaol diſtemper,
" is owing to a want of cleanlineſs and freſh air,
" &c. Be it enacted, that the juſtices, in their
" ſeſſions, ſhall order the walls and ceilings of the
" different cells to be ſcraped and white-waſhed

" once in the year, at leaſt, and ſupplied with freſh " air by hand ventilators or otherwiſe, and ſhall " order two rooms in each priſon to be ſet apart " for the ſick; that they ſhall order warm and " cold baths to be provided, and no priſoner to " go out without being firſt waſhed; they ſhall " appoint an experienced ſurgeon or apothecary " to each priſon, who ſhall report to the quarter " ſeſſions the health of the priſoners."

So far is this law from being complied with, that Mr. HOWARD obſerves " he found few in- " ſtances of inſpection of the gaols by magiſtrates " on account of the danger attending them. And " that he found one inſtance of an apothecary " who ſtipulates in his bargain, not to be obliged " to viſit the cells."

Mr. HOWARD relates that in Cambridge town bridewell " in the ſpring 1779, ſeventeen women " were confined in the day time, and ſome of them " at night, in the work-room, which has no fire " place, or ſewer. This made it extremely offen- " ſive and occaſioned a fever or ſickneſs among " them, which alarmed the *Vice Chancellor*, who " ordered

" ordered them all to be diſcharged; two or three " of them died within a few days."

Many people expreſs ſurprize, and wonder why the gaol fever is more frequent and fatal in our priſons now, than ſome years back, and are ready to aſcribe it to the ignorance or inattention of the ſurgeons; however a little conſideration of the cauſe of this fever will ſoon explain that matter. The number of priſoners now in moſt jails exceeds the number that was in them five years ago, by more than one half.—And it is generally known that crowding men in a narrow compaſs without change of air, moſt frequently brings on ſuch diſorders.—In 1773 Mr. HOWARD viſited the priſon in this town, and the number of priſoners was at that time as follows, " April 16, debtors 15.— " Felons 23, including convicts."—Mr. HOWARD adds, " I found the gaoler attentive to cleanlineſs " and regularity." The number of felons laſt lent aſſize was 106, debtors 29, more than three times as many as five years ago.

As to the cauſes and cure of the gaol fever, they have been written upon ſo fully by Dr. Monro and

and Sir John Pringle, that it would be unneceſſary to ſay any thing upon thoſe ſubjects in this pamphlet, as thoſe books are in the hands of moſt people, and have ſuperſeded any remark that I could pretend to make.

The principal object is to remove the contagious foul air.

As to human contagion, the nature of it does not ſeem to be well underſtood, it not being an object of our ſenſes; nor can we examine or make any experiments upon it to diſcover its qualities. The ſpecific nature of that contagious matter which occaſions theſe putrid diſorders is hard to be deſcribed, and the variety which may have appeared in the ſymptoms of perſons affected by them depends, probably more on the difference of climate, ſeaſon, and the peculiar conſtitution of different people; than on any ſpecific difference in the original quality of the infectious matter itſelf. It is well known that the vapour or perſpiration which conſtantly flows out from all parts of the human body, through the pores of the ſkin, if long confined in the ſame room or place without mixing with freſh air, will

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at laſt become infectious and bring on a fever of the moſt dangerous kind. This is proved by the experience of moſt ſurgeons who have attended hoſpitals or priſons.

And the complaint having appeared in different places and at different times of the year, ſhews that the cauſe of it is generated immediately among perſons thus crowded, and not always conveyed from one place to another by infection, as ſome other infectious diſeaſes are.

From what has appeared among the ſick of the priſon of this town, one is rather led to ſuppoſe that the virulence of the contagion is much more influenced by the numbers thronged together, than by the ſeaſon of the year; as during the ſummer 1783, in the month of July the weather was very hot, and the air cloſe and thick, when the gaol fever appeared here in the priſon, yet it did not ſpread with one fourth part of the rapidity that it did in January following, when the whole ſurface of the earth was covered with ſnow; occaſioned evidently by the greater number of priſoners in the winter than in the ſummer.

Although

Although the infection in the priſon of this town has been as powerful and fatal as in almoſt any inſtance where the attention and care have been equally good; yet it does not appear that it has ever been communicated to any perſon, except to thoſe who have been very near the bodies of the infected, or in the direct current of the currupt air; which was the caſe of Charles Cutbuſh, ——— Pendall, and ——— Pooley, carpenters, and William Cutbuſh, a ſmith, who mended the hole in the priſon hoſpital, through which one of the felons had made his way out: Pooley, an elderly man died, the other three recovered.

It is well known and remark'd by every one who has had any experience of gaol infections and confined rooms, that the clothes either of the body or beds, become, through time, more infectious than the patients themſelves; and that the diſorder has been communicated at a diſtance from any infected place, by ſuch clothes. Infectious particles thus generated ſeem to be the real cauſe of the gaol fever; and Mr. Howard in his appendix quotes a long paſſage from Dr. Mead's works to prove this; which, as few people may have

have read Mr. HOWARD's book, and few or none, but medical people, have read MEAD's works, I ſhall take the liberty to tranſcribe. Dr. MEAD in his diſcourſe on *peſtilential contagion* obſerves; "Nothing approaches ſo near to the firſt original "of *contagion*, as air pent up, loaded with damps, "and corrupted with filthineſs, that proceeds from "*animal bodies*. Our common *priſons* afford us an "inſtance of this, in which very few eſcape, what "they call the *gaol fever*; which is always attend-"ed with a degree of *malignity* in proportion to "the *cloſeneſs and ſtench* of the place. And it would "certainly very well become the wiſdom of the "government, as well with regard to the health of "the town, as in compaſſion to the priſoners, to "take care, that all *houſes of confinement*, ſhould be "kept airy and clean as is conſiſtant with the uſe, "to which they are deſigned. As *naſtineſs* is a "great ſource of *infection*, ſo cleanlineſs is the "greateſt preſervative."

Mr. HOWARD, remarks that he ſeldom or never ſaw any thing of the gaol fever abroad, although he had found priſoners in dungeons and cells, as foul and dirty as any in England, his own words

 are

are as follow, concerning the gaol fever. " If I " were aſked, what is the cauſe of the goal fever? " It would in general be replied, *the want of freſh air and cleanlineſs*. " But as I have found in a few " priſons abroad, cells and dungeons as offenſive and " dirty as any I have obſerved in this country, where, " however, this diſtemper was unknown, I am oblig- " ed to look out for ſome additional cauſe for " its production. I am of opinion, that the ſudden " change of *diet* and *lodging* ſo affects the *ſpirits* of " new convicts, that the general cauſes of putrid fe- " ver exert an immediate effect upon them. Hence " it is common to ſee them ſicken and die in a ſhort " time, with very little apparent illneſs. Convicts " are generally ſtout and robuſt young men, who " have been accuſtomed to free diet, tolerable lodg- " ings, and vigorous exerciſe. Theſe are ironed, " and thruſt into offenſive dungeons, ſome of them " without ſtraw or other bedding; in which they " continue in winter ſixteen or eighteen hours out " of the twenty-four, in utter inactivity, and immer- " ſed in the noxious effluvia of their own bodies. " On this account the gaol diſtemper is always ob- " ſerved to reign more in our priſons during the

" winter

" winter than ſummer; contrary I preſume, to " the nature of other *putrid diſeaſes*. Their diet, is " at the ſame time low and ſcanty; and the powers " of life ſoon become incapable of reſiſting ſo many " cauſes of ſickneſs and deſpair."

It has been an obſervation, and is well known to moſt people in the world, that motion communicated to the air prevents its corruption and carries off foul vapours which riſe from the earth, from ſtagnant waters, and alſo which have been obſerved to riſe from noxious plants and trees in general: But Dr. PRIESTLEY, and in particular Dr. INGEN-HOUSZ have found from many experiments, that, although plants and trees of all kinds ſend out a vapour which fouls the air, particularly at night; yet they have a power of purifying the air in the day, by abſorbing the noxious particles that float in it. Dr. INGEN-HOUSZ ſays " It will, " perhaps, appear probable that one of the great " laboratories of nature for cleanſing and purifying " the air of our atmoſphere, is placed in the ſub- " ſtance of the leaves, and put in action by the in- " fluence of the light." And not only ſo, but that vegetables have a power of generating and

emitting air four or five times more pure than common air; and which will ſerve four or five times longer for reſpiration than the common air we breathe, in general. The ſame ingenious writer in ſec. IX, obſerves, " all plants poſſeſs a power of " correcting in a few hours, foul air unfit for reſ- " piration; but only in a clear day-light, or in " ſun-ſhine." And the Doctor mentions in the the ſame place, " This remarkable property of " plants is indeed very great; for in a few hours, " nay even ſometimes in an hour and a half, " they purify ſo much a body of air, quite unfit " for reſpiration, as to be equal in goodneſs to " atmoſpheric air." The ſame author mentions in another place. " This power of plants extends " itſelf even to the worſt of all airs in which an " animal finds his deſtruction in a moment; ſuch " as is pure inflammable, and highly phlogiſticated " air."

The fine pure air generated by the leaves of the trees, is found to be heavier than common air, and of courſe deſcends to the ſurface of the earth; while moſt kinds of air fouled by being uſed by animals become lighter than the common air, aſcend,

aſcend, and are abſorbed by the pores of the vegetables every where; ſo that there is a change of bad air into pure wholeſome air, formed by the powers of plants, and all vegetables growing upon the face of the earth; and, perhaps this may be one reaſon why the gaol fever is more mortal in winter than in ſummer, as the leaves of the trees and the growth of the vegetables are in a great degree put a ſtop to.

In looking over Mr. HOWARD's account of the priſons abroad, I find that the priſoners were generally accommodated with clean and healthy food, both animal and vegetable; that the priſoners are frequently employed in ſome kind of manufacture, of which they profit a little, as they always are allowed a certain proportion of what they earn; this is a great advantage and encouragement, as it keeps the mind engaged to their employments, and prevents the ill effects that chagrin and deſpair inſpire, which tend ſtrongly to weaken and diſorder the ſpirits and render the body more feeble, and leſs able to reſiſt the power of infection; as it is well known that grief and deſpair preying continually upon the ſpirits, render the body weak

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and irritable, and prediſpoſe it to be more liable to the contagion with which they are conſtantly ſurrounded. Add to theſe obſervations, that the people on the continent are not brought up with ſuch licentious notions of liberty as the people of this country, of courſe confinement is not ſuch a diſtreſs to them. Alſo the inhabitants of our country are ſuppoſed to eat more animal food, and drink more ſtrong beer than the inhabitants of the continent, by which a fullneſs of habit and a diſpoſition to *ſcorbutus*, or a putrid ſtate is much more readily brought on. And alſo the exerciſe of the body in their employment is of ſervice to the foreign convict in keeping the circulation alive.

Cleanlineſs is an article ſo much inſiſted upon by every one, that it may not be improper to conſider ſome of the circumſtances wherein it conſiſts; and they ſeem to be not very numerous; air, diet, clothing, and bedding, ſeem to comprehend the whole. As to air, Dr. MONRO obſerves, that whatever medicines or means are uſed, if the patient continues to breathe in an infected foul air, he has never found that any thing had the deſired effect; and yet freſh air is not all that is wanting; ſince

ſince if there be any defect in point of diet, as there frequently is; if priſoners are ſupplied with bad or putrid meat, and poor coarſe bread, vapid beer, or water not pure, or the victuals improperly dreſſed; the ſeeds of the complaint may be nouriſhed and continued thereby.

It has been taken notice of, that contagion comes to a greater degree of virulence by being confined in the clothes of a perſon infected, than where it is immediately exhaled from the ſurface of the body or lungs; this ſhews the preſſing neceſſity there is to have a change, and to have their clothes waſhed and fumigated as frequently as poſſible. As the covering by day ſhould be cleanſed and changed frequently, ſo ſhould the bed clothes alſo undergo the ſame management. All old tattered bed clothes ſhould be burnt or buried, and replaced by new ones, and the new clothes for the beds ſhould alſo be changed every week and waſhed.

I am creditably informed by a perſon who was at Wincheſter all the time of the gaol fever among the French priſoners there, about three years ſince; that

that nothing ſeemed to anſwer properly until the bedding and clothes were changed and freſh clothes ſupplied, to which were added frequent waſhings, as all the priſoners who were at that time not infected were marched down every day to the river to bathe, by which they got their bodies clean of all ſordes; and they had thereby exerciſe and breathed the freſh air. Of ſuch conſequence did the freſh clothing and bedding appear, that although the appartments were large and airy, together with a ſpacious airing ground, yet they continued to drop three or four every day, ſo that in the ſpace of a month, one hundred and thirty or more priſoners died; and after the new clothes, together with other uſual means which had been adopted before: The diſorder ſeemed to give way almoſt directly. Mr. HOWARD ſpeaks expreſsly concerning the neceſſity of clean bedding, and the bad effects of priſoners or others ſleeping in their body clothes, and relates an obſervation which he had heard made by an old general. "That he always "found his men ſubject to illneſs and diſeaſes when "they lay in camps, *not* from *dampneſs* but from "*lying in their clothes* and want of *proper bedding;* "for that at the ſame time, all his officers had

"been

been quite healthy and well." Mr. HOWARD adds "whatever be the cauſe of this difference, "whether a *more free perſpiration* in bed, *taking off* "*bandages*, or *ventilating of clothes*, I am fully convin- "ced of the fact." With regard to the great efficacy of waſhing, he, when ſpeaking of Hertford gaol, ſays, "in mentioning the gaol fever, I ſhould "have added, I was well informed that a priſoner "brought out as dead, from one of the dungeons, "on being *waſhed under the pump*, ſhewed ſigns of "life, and ſoon after recovered. Since this I "have known other inſtances of the ſame kind."

It is certain that human contagion is retained in the filth and dirt which is lodged in dirty old clothes of priſoners, as well as on the *ſordes* of the ſkin; and it has been a ſubject of doubt, whether the infectious matter does not require ſome ſubject as a vehicle to carry it, either in the air or on ſuch rags: Now in the writings of Dr. PRIESTLEY and others it is mentioned, that as well as a great degree of contagion; there is alſo an exhalation of fixed air diſcharged from the body, particularly by the breath, and this is eaſily determined by a ſimple experiment. Let any perſon take a crooked glaſs

tube and put ſome lime water into it, ſo that at the moſt dependent part of the glaſs it ſhall be full, and then let the perſon blow his breath through the glaſs; by this means the lime will be precipitated and turn of a white turbed appearance; this effect is alſo produced by paſſing fixed air through the tube, which is a proof that there is fixed air always paſſing out from the lungs, whether in a ſtate of health or not. Dr. INGEN-HOUSZ obſerves that the "Abbè Fontana found, that an animal breathing in, either common or dephlogiſticated air, "renders it unfit for reſpiration, by communicating to it a conſiderable portion of fixed air, which "is generated in the body, and thrown out by the "lungs as excrementitious. This fixed air is eaſily "abſorbed by ſhaking it in common water, but "infinitely more readily by the contact with quick "lime water." This diſcharge of foul air from the lungs, ſeems to be one conſiderable cauſe of rendering the common air noxious and unfit for reſpiration, as may be very eaſily obſerved by any perſon breathing for ſome time in a narrow cloſe place. Even the flame of a candle is extinguiſhed by it, and animals die in it in a very ſhort time, and ſometimes inſtantaneouſly, as has been proved

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in deep wells, caves, and in cellars, where the air is much confined, and where fermentation goes on.

Whatever may be the nature of fixed air, it ſeems highly neceſſary in the human body, but extremely dangerous if taken into the lungs; it ſeems to conſtitute at leaſt, one part of the means that keeps the ſolids from paſſing into a ſtate of relaxation and diſſolution; this alſo appears to be the caſe in vegetables, as by fermentation the ſolution of the union of the parts of the vegetable is brought about, and at the ſame inſtant the fixed air is making its eſcape, and may be collected by an eaſy experiment.
(See Rees's Cyclopædia, at the article *Air fixed.*)

It is probable that ſomething more is diſcharged from the lungs, and the ſurface of the bodies of ſick perſons, than merely fixed air; as during the courſe of a fever, particularly an infectious one; a diſcharge of ſomething replete with the nature of the cauſe of the diſtemper may be ſuppoſed to happen, by the breath, and pores of the ſkin: As alſo, by ſome of the lateſt experiments it is found

that pure fixed air is heavier than common air; this infectious ſubſtance may perhaps be of the quality of inflammable air, which is much lighter than common air. Dr. PRIESTLEY has diſcovered inflammable air to ariſe from animal as well as vegetable and mineral bodies; (See Rees's Cyclopædia at *Air inflammable.*) and this ſerves to account for what we daily obſerve in practice, which is, that the infected air of priſons and hoſpitals always riſes; as was particularly exemplified in the caſe of the people, who repaired the hole in the ceiling of the hoſpital from whence a man made his eſcape.

Dr. M'BRIDE endeavours by a variety of experiments to prove, that in the corruption of animal ſubſtances, a great quantity of fixed air is let looſe; and that the ſame fleſh when ſpoiled, may be ſweetened by communicating fixed air to it again: This naturally leads to the obſervation, that, in putrid fevers where a diſſolution ſeems to take place in the body, and where the reſpiration is quickened; a much greater quantity of this fixed air, with ſubſtances of other qualities are diſcharged; and that the air is much ſooner rendered foul by perſons ill of ſuch complaints, than by thoſe who are in health.

With regard to the condition of jails crowded with priſoners, and not well ventilated, which is generally the caſe, on account of the thickneſs of the walls, and the narrowneſs of the windows, the air is always foul; although it does not always produce infection or the gaol fever; and this foulneſs ſeems to conſiſt of fixed air with ſome inflammable air; and no doubt a contagious matter or vapour, which ſeems to be the immediate cauſe of the gaol diſtemper, when it appears. What the nature of it is, and how it acts upon the human frame remains entirely undetermined; it however ſeems to accompany the foul air, and not in any inſtance which has happened in this place, appeared to have infected any perſon who had not been in the rooms where the priſoners were, or near ſome of thoſe who were infected.

However infectious the contagious matters may be, yet they do not affect all people alike; ſome are taken ill on being very ſlightly expoſed to the foul air, while others are in it for weeks unhurt; and there is an inſtance of one of the felons in the priſon of this town, who attended upon the ſick night and day for ſome months, and only ha

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once a ſlight head-ach, and illneſs which confined him about twenty-four hours, and which he got rid of by a vomit, and the uſual medicines, bark and red wine.

With a view to purify places where the air is foul and in a fixed ſtate, nothing ſeems more proper than a ſubſtance of ſuch quality, that it may be generally applied, and at the ſame time, have a power of abſorbing, and of courſe, of altering the quality of ſuch air: Theſe requiſites are found in lime water; as from its cheapneſs it may be had in any quantity, and for the manner of applying it mention will be made hereafter. And from the experiment formerly noted, we find that fixed air and lime water have an attraction to each other, ſo as to deſtroy each others nature, and produce a new ſubſtance, which appears to be innocent.

In making lime water, it was formerly directed to put a gallon, or a gallon and a half of water to one pound of freſh burnt quick lime; but it appears from Dr. Alston's experiments, that one pound of quick lime is ſufficient to make ſeventy-five gallons (i. e.) ſix hundred pints of lime water, very

very good and fit for uſe. It has been thought neceſſary that the lime which is uſed ſhould be freſh calcined, that the water ſhould be hot, and poured on gently. Dr. ALSTON, who paid a great deal of attention to the proceſs of making lime water, and drank it for a great many months together, took notice that, "it was generally believed, that in "order to obtain good lime water, the quick lime "muſt not only be recent and fully calcined, but "alſo for one part of quick lime, only eight, "ten, or, at moſt twelve parts of water taken; as "if it could impregnate no more." But the Doctor ſays. "He has found by many experiments, that "it is altogether indifferent, whether the water be "hot or cold, poured on gradually, or at once, "the water poured on the lime, or the lime thrown "into the water; whether the quick lime be in "ſhells, or ſlaked, or even expoſed to the air for "ſeveral months, for ſuch quantities of the water "as are commonly uſed; and if the quick lime be "freſh, whether for one pound of it, eight, ten, "twenty, fifty, or five hundred pounds of water be "taken." The Doctor, for his own uſe, poured about eight pounds of boiling water, upon one pound of ſtone quick lime, in a glazed earthen veſſel.

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He drank about a pint and a half of this lime water, daily for about ſixteen months, filling up the veſſel, when neceſſary, with freſh water, ſometimes hot and ſometimes cold, without obſerving any difference in it: He obſerved, that the lime was not exhauſted after two years and two months, nor was the water ſenſibly weaker (See Rees's Cyclopædia at the article, *lime water*.)

It is not propoſed, however, to aſſert that lime will make as ſtrong lime water after it has been long expoſed to the air, as directly after burning, at leaſt it will not make ſo much; as unſlaked lime recovers its original quality from the air, and becomes inert if long expoſed to it; but this effect only takes place on the ſurface of the lime, and does not become general, unleſs the lime be ſtirred about frequently and expoſed to the air on every part of its ſurface.

From the obſervations of Drs. Alston and M'Bride, we find that lime water penetrates deeply into moſt ſubſtances, and abſorbs the fixed air that it meets with; and on this account it muſt promiſe to be of great advantage to ſcour and waſh the

the walls and floors of infected rooms with it, and thereby deſtroy the vehicle of infection: As we have endeavoured to ſhew that from the experience of the infection at this priſon, the contagion never ſeemed to ſpread further than the foul air extended; for this reaſon it appears to be indiſpenſibly neceſſary firſt of all, to exhauſt the rooms infected, of their foul air; this ſeems to be the voice of all perſons of eminence, who have had moſt experience in the gaol fever; and to ſtrengthen this opinion, together with other means of purification uſed for that effect, I ſhall mention what I have met with in Mr. HOWARD's obſervations, who ſays, "after "the gaol fever has prevailed in a priſon, nothing, "probably will be ſo effectual in deſtroying all re- "mains of infection, as the mode of fumigation "practiſed by the ingenious Dr. LIND, for infected "ſhips." The following is an abſtract from the Doctor's obſervations, which he favoured Mr. HOWARD with. "Charcoal fires ſhould be lighted "in the morning, and allowed to remain 'till the "evening, and half a pound of brimſtone thrown "upon each, their ſmoke in the mean time being "cloſely confined. They may be made in iron pots. "The fumigation ſhould be repeated every day for

" a fortnight. Every evening after the fumigation,
" the ports and hatchways ſhould be opened, and the
" inſide of the ſhip waſhed with warm vinegar; and
" after the laſt fumigation, before the men return to
" the ſhip, the decks ſhould be thoroughly ſcraped
" and cleaned. If the infection has been very vio-
" lent, the parts of the ſhip moſt expoſed to it may
" alſo be white-waſhed. Every thing ragged and
" dirty ſhould be deſtroyed, as alſo the clothes and
" bedding of ſuch as brought the infection into the
" ſhip; the bedding of ſuch as died of the fever, and
" unleſs the infection has been very mild, the bed-
" ding of ſuch as have had the fever, though reco-
" vered. The remaining clothes and bedding ſhould
" be purified, by being expoſed twice a week to the
" ſteams of brimſtone and charcoal; or when the
" brimſtone might be ſuppoſed to injure the clothes,
" they may be hung up in a cloſe place, expoſed to
" the ſmoke of tobacco ſtrewed on charcoal fires.
" Linens, and ſuch articles as will admit of being
" wet, ſhould after the firſt fumigation be ſteeped for
" ſeveral hours in cold water or leys be well waſhed,
" and then dried in open air. If during the fort-
" night of this fumigation, any perſon is taken ill of
" the fever, the fortnight ſhould again commence

" from

" from the day on which the perſon leaves the ſhip.
" Strict attention ſhould be paid to the cleanlineſs
" of the men, both in their perſons and apparel;
" ſuch as are ſluggiſh and dirty ſhould be made to
" bathe and clean themſelves; and a ſufficient quan-
" tity of ſlops ſhould be iſſued, that every man may
" have a change of clothes."

The fires in this manner of purification, will have the beſt poſſible effect, as they rarify the air, and cauſe it to paſs out at any outlet that may be for it to paſs through, and at the ſame time, freſh air is received. But this is practicable only on board of ſhips or in hoſpitals, where they have a power of removing the men from the infected places, during the proceſs; and not in a crowded jail, as felons ſeldom or never have that privilege.

One would ſuppoſe that Dr. LIND and moſt others of the faculty, who have given directions to uſe vinegar and the fumes of ſulphur, think that the contagion is of a putrid nature, and that they deſigned to correct it by the contrary qualities, viz. thoſe acids which are known to counteract putrifaction; but although in the diſcharges from

the human body by the breath and perſpiration, there may be putrid exhalations; yet it is not certain that the matter of the contagion itſelf is of that quality, and if it be true that the fixed air is the vehicle of the contagion, as it appears to have been here, the moſt proper method will be to adopt ſubſtances, which will have the greateſt power in deſtroying and abſorbing the fixed air; theſe ſeem to be particularly lime water, or any thing of a cauſtic alkaline nature, as quick lime and water, or leys; and the Doctor has alſo mentioned the ſteeping the linens in leys to purify them, as if he had been perſuaded that fixed and foul air might be corrected thereby, particularly that which is confined in the clothes, which we have found to be in general more infectious than the patients themſelves; and if lime water or leys, is more powerful in this particular, why not adopt it more generally, as it is ſo cheap an article?

The uſual methods of fumigating with vinegar and different ſubſtances, as alſo diſcharging gunpowder, had been practiſed for ſometime in the priſon of this town, during the months of January and February, when the infection was ſo ſtrong, that

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at one particular time there were between fifty and ſixty perſons unwell, including thoſe who were dangerouſly ill, others freſh attacked, and the convaleſcents; yet nothing ſeemed to anſwer the deſired effect until the uſe of the lime water was adopted, together with a more extenſive uſe of what had been before applied; that is, the fumigations, and in particular the diſcharging greater quantities of gunpowder in all the wards, once or twice a day, whilſt all the internal openings were cloſe ſhut, and the external ones open. To what has already been taken notice of, it may be farther added, with reſpect to the change of clothes, that theſe were procured by the committee for ſuperintending the priſon, who exerted themſelves very much, and perſevered until a double ſuit of convenient and warm clothing was got for every one, both bed and body clothes; their old clothes, ſuch as were not worth waſhing, being either burnt out of town, or buried deep in the earth; it was not thought proper to throw them into the river, as they might have been taken out and ſold as old rags to the paper mills, with danger of ſpreading the infection.

A number of beds and bedding were alſo purchaſed, and the old beds were replaced by them;

and when the trials came on, each man had a change of new clothes to put on when coming into the court-hall, by which the dread of the infection was in a great meaſure removed from the minds of the people concerned.

Lime water and the manner of applying it, which will be deſcribed hereafter, occurred to me in conſequence of a requiſition of ſome of the members of a ſociety lately inſtituted in this place, for the *diffuſion* of *uſeful knowledge*; by whom I was deſired to turn my attention to any thing that might be uſeful in removing the infection, which raged ſo much and ſo fatally at that time in the priſon.

After conſidering what had been done, it appeared that ſomething was wanting to purify the air, by precipitating its contents; as the outlets were not ſufficiently convenient to purify it by diſcharging the air, which was foul, and to let in freſh; to this purpoſe I met with an obſervation in Sir JOHN PRINGLE's treatiſe on the *Diſeaſes* of the *Army*, who, when ſpeaking of the face of the country of the Netherlands, and of the air and moiſture and impurities in the air, mentions,

" Frequent

" Frequent ſhowers, during the hot ſeaſons, cool " the air, check the riſe of vapours, dilute and " refreſh corrupted waters, and precipitate the " putrid and noxious effluvia." This obſervation may be made by any one, that after a ſhower, the air generally appears more clear, and cleanſed from the ſmokey and other impurities that it was loaded with before the ſhower. A procedure ſomething like this, is obſerved by people who go down to clean deep wells, if they apprehend any foul air, as frequently happens, they let down a candle, by which they diſcover the ſtate of the air in their paſſage to the water; if the flame burns clear all the way to the bottom, there is thought to be no danger in going down; if the flame appears blue and grows ſmaller, it is a proof that the air is unfit for breathing, and they throw down quantities of water, by which they purify the air, and render their deſcent ſafe: From which idea I invented a machine to cauſe lime water, or any fluid to paſs from the upper to the lower parts of the wards, in a ſhower, (without wetting the floor) with a view to carry down the contents of the air, according to Sir JOHN's idea. (See plate the firſt) A, the ciſtern, into which the lime water or vine-

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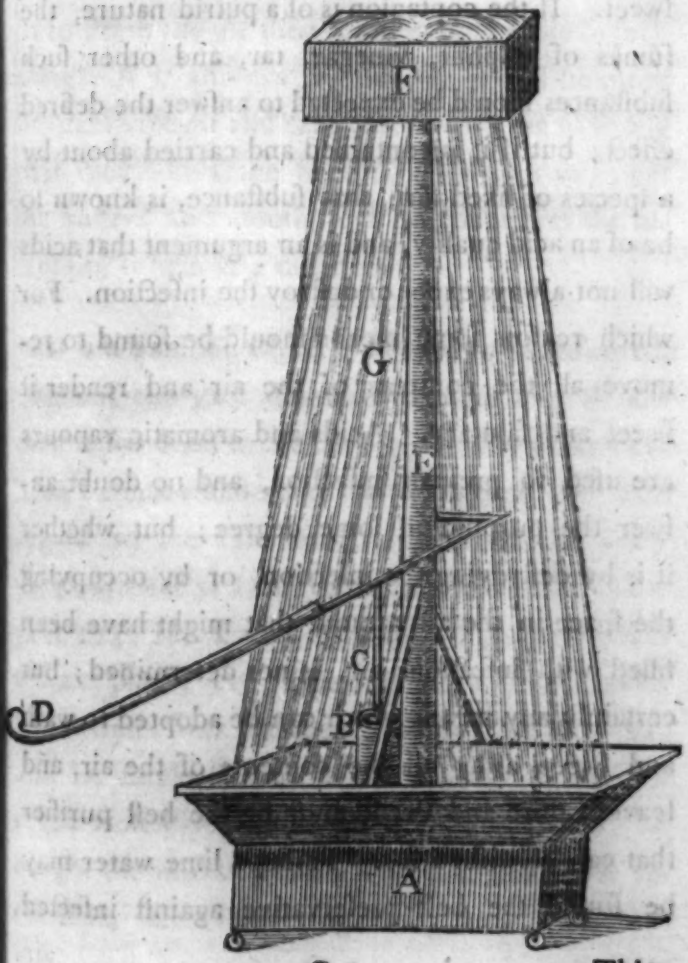
gar impregnated with antiſeptic herbs is put.—B, the working barrel.—C, the piſton rod.—D, the lever.—E, the aſcending pipe, through which the liquor is forced into F, the reſervoir; which is perforated with a hot iron to let the liquor fall in a ſhower as at G, into A, the ciſtern again; and repeated at different parts of the room, 'till it has paſt through as much of the confined air as poſſible; and over each bed, and ſuch parts as it could not be wheeled to, it is directed, that a man force away by a large fan, the air of ſuch places towards the purifier, to make room for that which has been corrected. This machine was uſed daily in the wards of the priſon, and likewiſe in the hoſpital, when not too much incumbered with beds, to admit of its being worked.*

So refreſhing did the frequent ſhowers of lime water appear to the confined men, that each eagerly expreſſed a deſire of working the machine, that he might breathe the air thus purified, immediately from its being corrected, and after it had been uſed in one ward, one and all declared, it reſembled the earth being cooled in a ſultry hot day, by a haſty

* All the parts of the machine can be taken apart for the conveniency of its being removed to different places.

haſty ſhower of rain! add to this, while the men were in the court-yard, one ward every day was exhauſted of its foul air, by boiling antiſeptic vinegar and boiling lime, and freſh air admitted: The method of which ſee hereafter.



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This has been found to anſwer for cleanſing and cooling the air, much better than the diſcharging a great quantity of ſmoke and other vapours, which ſeem only to load the air ſtill more without anſwering the purpoſe of purifying it, and rendering it ſweet. If the contagion is of a putrid nature, the fumes of ſulphur, vinegar, tar, and other ſuch ſubſtances ſhould be expected to anſwer the deſired effect; but if it is contained and carried about by a ſpecies of fixed air; that ſubſtance, is known to be of an acid quality, and is an argument that acids will not always expel or deſtroy the infection. For which reaſon ſome means ſhould be found to remove all the contents of the air and render it ſweet and ſalutary. Acids and aromatic vapours are uſed to prevent infection, and no doubt anſwer the purpoſe in ſome degree; but whether it is by deſtroying the infection, or by occupying the ſpace in the air around that might have been filled with infectious air, is not determined; but certainly any means which can be adopted to waſh and ſweep away all the contents of the air, and leave it pure and ſweet muſt be the beſt purifier that can be wiſhed for. Perhaps lime water may be found the beſt preſervative againſt infected

air

air for thoſe whoſe employment may oblige them to go into it; by wetting a handkerchief, or a flannel, which is thicker and anſwers better to let the air paſs through it, and by keeping it to the mouth and noſtrils, ſo as to breathe through it, and ſo to ſtrain the air uſed for breathing while in ſuch places; if it anſwers the purpoſe it will be more fit, than vinegar and camphire, which are ſo ſtrong that they affect the breath, when kept too near the noſtrils and mouth, and do not anſwer the intention, if held at a diſtance.

It is a queſtion which is deſired to be anſwered, whether, the gaol diſtemper is more mortal now than it has been in the laſt forty or fifty years paſt? This I cannot undertake to determine, but with regard to the diſtemper here for the laſt forty years, as near as I can learn; it appears that in the year 1744 Mr. Carey, commenced gaoler, he ſays a ſlight putrid fever appeared in the priſon at different times from priſoners brought from Newgate; and he thinks it was in the year 1748, when it raged violently, and carried off a great many, he caught the infection himſelf at that time, and recovered, after lingering along time. Bobert

Burton, his turnkey died with it. Mr. Carey was keeper of the gaol eleven years, and had not the diſtemper a ſecond time; but as the fever raged very much in 1755, he reſigned, and his brother James Carey ſucceeded him, who caught the diſtemper and died of it. He was ſucceeded by Thomas Hook, a ſervant of William Champneys, eſq. who ſoon after caught the fever and died. Mr. Ore the clergyman who attended the gaol about that time, was taken with the infection and died. John Stevens ſucceeded T. Hook, he caught the fever and recovered. Robert Stevens, his brother, the then and preſent turnkey received the infection, and has not had it a ſecond time, although he has attended conſtantly during the diſtemper of this laſt winter, and for theſe ſix or ſeven and twenty years paſt. Stevens's father, an elderly man, came from Harietſham to ſee him, took the infection and died, as did his mother; likewiſe his father's ſiſter, Mary Weſt, who went to ſee her brother, caught it and died.

Mr. Waller, who was ſurgeon to the gaol forty-two years, caught the fever the ſecond year of his attendance, and although he attended the ſick of

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the diſtemper, without ever ſparing himſelf, in many ſucceeding attacks of it, yet he never caught it a ſecond time: He was fully perſuaded, that after having the diſtemper once, there was not much danger of it again. The ſame gentleman obſerved, that every ſailor brought into the priſon, that had the fever while belonging to infected ſhips, or priſoners that had it in other infected priſons, did not receive the infection in this gaol, although no ſteps were taken to keep them from the diſeaſed.

Mr. Peckham, the ſurgeon of the priſon at this time, ſuffered an attack of the fever, when it broke out laſt July, was ill the uſual time and recovered. He has ſhewn unremitted attendance to the ſick during the laſt winter months, when the infection was ſo violent, without receiving any injury.

From the information which I have been able to collect, it appears that the diſtemper has been very violent in times paſt; as the gaolers and turnkeys have ſuffered by it very much, and as the fever was ſo violent among them who were only ſometimes expoſed to it, and who had clean linen, ſlept

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and eat much better than the priſoners could be ſuppoſed to have done; it is probable the priſoners ſuffered as much in former times as of late; all circumſtances conſidered. The want of air and numbers crowded together ſeem generally to produce the gaol fever, this was the caſe in the priſon here laſt winter; the calendar contained a liſt of one hundred and ſix priſoners to be tried, whereas five years ago there were not more than twenty-three felons: This great increaſe of numbers accounts for the violent ſtate of the infection, which at one time was ſo noxious, that two felons died ſuddenly, one, who had been drinking ſome beer fell down and expired inſtantly, the other died in a few hours after the diſtemper ſeized him.

As to the full determination of the queſtion, whether a man can have the infection of the gaol fever twice, or whether it is like the ſmall pox and meaſles, which are ſaid never to attack the ſame perſon more than once; I cannot take upon me to determine a matter of ſuch importance; having had but ſmall opportunities in the gaol diſtemper; but if we were to judge from what I have been able to collect concerning the gaol fever in this priſon

ſon for forty years back, we ſhall be led to believe that inſtances are very rare wherein the ſame perſon ſuffers twice from the true gaol fever. There may be inſtances of a perſon having the diſtemper twice or oftener; but it is imagined that ſuch caſes are ſeldom met with, and that ſome of thoſe perſons who think they have had the complaint twice, or have attended others whom they ſuppoſe to have had it more than once; may be miſtaken, from the reſemblance which *nervous fevers* with putrid ſymptoms bear to the gaol fever.

Sir GEORGE PAUL, in his enquiry into the defects of priſons, took notice of the hardſhips that perſons were liable to from the gaol diſtemper, who were committed upon charges in themſelves very ſlight, and ſometimes not founded at all in truth.

The calendar of the priſoners tried here laſt lent aſſize preſents us with an additional ſet of inſtances, where perſons who have not been found guilty of any crime, and have been accordingly diſcharged, have been expoſed to the diſtemper for a number of months. The calendar contains one hundred

and

and ſix to be tried on various charges, twenty of whom were acquitted, eight were diſcharged; ſome of the charges were ſo ſlight, that it ſeemed almoſt cruel to put them into the way of infection: for example, Ann Blackbourn committed, charged "on ſuſpicion of ſtealing one "pewter pint pot," to remain "one month in "gaol." — Wm Brenchley committed the 22d. January, charged on oath with "ſtealing two "buſhels of peas;" this man remained near two months in priſon, ſome part of the time the complaint raged with great violence, and was at laſt acquitted.—John Cox and Francis Mills committed, charged with "ſtealing an iron wedge, and "ſome more bits of old iron."—Wm Eaton committed, charged with "ſtealing about one buſhel "of coals."—Nathanael Knight and Wm Anderſon committed, charged with "ſtealing a ſack, "containing three buſhels and a half of beans."—John Watkins committed, charged with "ſtealing "one ſilk handkerchief, and one pair of worſted "ſtockings." Diſcharged. Theſe are ſome of the charges for which certain felons were committed, and upon which account they ran great riſque of their lives. Out of the remaining number fourteen

died

died of the gaol fever, the charges of ſome of whom were not capital. What ſeemed peculiar diſtreſſing, was, that the debtors were ſubject to the ſame fate with the felons. From the 11th. of Auguſt to the firſt of March, ſix debtors died, two of which were confined for ten pounds each, and one of the two had been in priſon three years.

To exhauſt a ward of its foul air, and to let in freſh; I prefered the method of rarefaction; by boiling lime and boiling vinegar, (alternately uſed) to hand ventilators; and in order to inforce a ſtrict performance thereof, rewards were given to the men intruſted with the charge; and ſome few experiments on air were ſhewn, to convince them of the propriety of the procedure; which effectually and almoſt inſtantaneouſly deſtroyed the infection; and rendered the priſon pure again, without the removal of a ſingle priſoner; contrary, I preſume to the opinions of moſt people, acquainted with the condition of the priſon at that time. The ſucceſs this met with occaſioned it to be diſcuſſed at a meeting of the *Maidſtone Society for the diffuſion of uſeful knowledge*, and a motion was made and carried; that a copy of the plan I had given in, to the commit-

tee; ſhould be ſent franked to every goal in the kingdom.

The following is a copy with a deſcription of the engine uſed for the boiling liquor.

C O P Y.

To purify cloſe infected Places, as Gaols, Hoſpitals, &c. communicated to the Committee appointed to ſuperintend the Gaol.

JANUARY 25th. 1784.

"TAKE of rue, wormwood, ſage, lavender, mint, and roſemary, each an handful, put them altogether into a gallon of the beſt vinegar, and let it boil, and while boiling, let it be thrown to all parts of the room (viz. ceiling, walls, &c.) by a garden engine that has a fan or roſe, that will divide the liquor into very ſmall ſtreams. After which, the room is to be well dried with a brazier, while the window next the external air is open and all the interior openings ſtopt; then a little camphire may be carried in the room, burning in a fire-ſhovel.

N. B. If the room has the advantage of a fire place, the ingredients may be boiled there, and ſuffered

ſuffered to continue boiling ſometime, while the ſteam is conveyed into the room.

If the room has no fire place, and is too cloſe to burn charcoal, it may be kept boiling while it is playing on the infected places (if the engine is made of copper or tin) by a large heated iron placed under it.

It will be neceſſary while this is performing, that every door, window, or aperture that has not an immediate communication with the external air be cloſe ſtopt, and as many openings next the external air be left open, as can with conveniency be admitted, that as the rarefied impure air is forced out, as much of the pure freſh air may ſupply its place as poſſible.*

By the above method, what air is left impure after the rarefaction of the boiling vinegar, will be in a great meaſure corrected by the ſhowers of vinegar falling through it. But as this method will render ſuch rooms as are at the time inhabited, too wet to warrant ſuch a procedure, the following

* The opening and ſhuting of the different out and inlets muſt be ſtrictly attended to.

might be ſubſtituted, particularly where no fire or fire place is allowed.

Let a wide ſhallow tub (or what is more commodiouſly uſed, the machine,)† that has its bottom perforated full of ſmall holes, be placed on ſupporters, as near the ceiling as is convenient to pour in cold vinegar, and another on the floor, ſomewhat wider, immediately under the firſt, to receive the liquor as it falls; which will ſerve repeatedly in different parts of the room, 'till it has paſſed through moſt of the confined air.

Firing gunpowder will tend much to purify infected places, as the exploſion will force out a conſiderable column of air, and make room for the admiſſion of freſh, provided there is a communication with the external air as above recited; and the ſmoke will be the acid of ſulphur.

And as a conſiderable portion of fixed air is generated in the bodies of men, and thrown out by the mouth as excrementitious; the paſſing of lime water through it occaſionally, as the vinegar is directed

† The machine is here left out, as it is deſcribed in pages 39, 40, and 41.

ted to be done, will tend much to recover its ſalubrity, by the property it has of abſorbing it. And as every ſubſtance burning by fire, either in flame or ſmoke, phlogiſticates air, and renders it unfit for reſpiration, great care ſhould be taken after fumigations of every kind, to get rid of the air thus impregnated with the inflammable principle, and to let in freſh before the return of the men. The cloſeneſs of the wards in this gaol renders the latter caution peculiarly neceſſary.

From a ſtrict obſervance of the above method, fumigating with various ſubſtances, waſhing the walls, &c. with boiling lime, throwing quick lime from time to time down the neceſſaries and along the drains, frequent change of linen and other clothing, nutritive food, and conſtant attention to cleanlineſs; the men being waſhed daily with warm ſuds, and the clothes, &c. dried every week upon an oaſt with ſulphur; the diſorder ſo prevalent in this county gaol has been totally eradicated. Though few days paſt without freſh commitments, no more than two perſons can be found to have taken infection after the adoption of theſe precautions."

(See

(See plate the ſecond) A, a common garden engine made of ſtout copper, well revitted, to bear the heat of the fire, with a pipe and fan joined to the pump barrel, and made capable of any degree of elevation by means of ſcrews.—B, the receiver for the heated iron, inſtead of its being placed under it, as mentioned in the directions given to the committee.—C, the heater and hook. The rim of the upper part of the heater ſhuts cloſe on the top of the receiver to prevent the liquor from falling in.—D, the lever or pump handle.

As it was thought neceſſary to waſh and ſcrape the walls of the cells, I choſe the method laid down, to exhauſt the wards of the foul air, by rarefaction of ſuch ingredients as appeared a ſpecific againſt contagious matters: Great care was taken to have every aperture leading to the internal part of the priſon ſhut cloſe, while all the openings next the *external air* were left open; that as the foul air was rarefied, and from its lightneſs, made to paſs out of the upper part of the openings, freſh air might be admitted in at the lower part. The engine at the ſame time playing in all directions, in every corner and crevice of the room,

muſt

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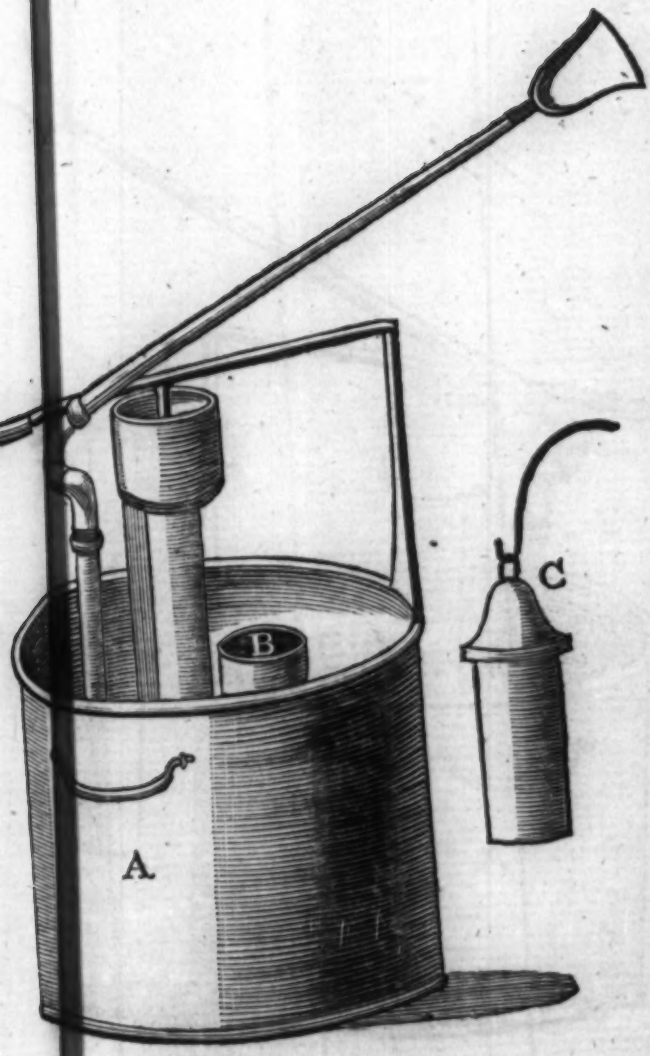
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muſt, of neceſſity force out the impure air, and pure wholeſome air ſupply its place, when the room is thoroughly dry and cooled: And as the freſh atmoſpheric air admitted, is more denſe, than air ſpoiled by reſpiration, it will not immediately be changed or mixed with the impure air, if the communications are not frequently opened, or left open any length of time.

To prove that plogiſticated air paſſes out at the upper part of an opening, while freſh atmoſpheric air is admitted at the bottom, is evident, from that ſimple but uſeful diſcovery of Dr. Hales; that if the air of a room be heated, and the door thrown open, and a lighted candle held to the upper part of the door-way, the flame will be driven out by the more rarefied air paſſing out above; but if held near the bottom, the flame will be forced in by the cold air ruſhing into the room; and between the two currents the flame will become ſtationary.

The common method of fumigating rooms by burning ſubſtances, has not in general the deſired effect; eſpecially in large places, where ſeveral

rooms

rooms join; and although every thing burning rarefies the air as well as the boiling lime; yet as little or no attention has been paid to the opening and ſhutting the out and inlets of rooms, (as if ſome ſpecific ſubſtance was thought to riſe in fume, from fumigations, ſufficient to correct the noxious particles in the air and render it ſweet) I have therefore ſuggeſted this precaution. I am very doubtful with regard to many ſubſtances, burning either in flame or ſmoke, whether they have this effect, any farther than as being inſtrumental in forceing out foul and letting in freſh air; therefore if proper attention be not paid to the different openings, thoſe fumigations are in a great meaſure of no effect, but render the included air more unfit for reſpiration.

APPENDIX

APPENDIX.

THE common atmoſpheric air, that vivifying element, without which, a ſingle moment would put a period to all animals; deſerves the attention not only of thoſe that have applied themſelves to philoſophy, but of every man, that he may profit by the advantage, and avoid the danger of peculiar ſituations. This elaſtic fluid is diffuſed univerſally, where ever life by the wiſdom of the omnipotent is intended to ſubſiſt; and its good and noxious qualities require a particular deſcription by ingenious men, from accurate obſervations and experiments; that many uſeful members of ſociety may not ignorantly run themſelves into an inviſible fluid, rendered more deleterious in its quality by noxious vapours, than the moſt known chemical poiſons. But as neither my time or abilities are ſufficient for a proper explanation of this ſubject, I muſt leave it for ſome ingenious perſon, more capable of inſtructing thoſe who are ignorant of the principles and properties of the different airs; and content myſelf with communicating to the public a few experiments,

that will, I flatter myſelf, tend to preſerve the health of thoſe whoſe conſtitutions may have been frequently injured by an inviſible cauſe, that had eſcaped the obſervation of many valuable men, whoſe health would have been of importance to the community.

Air is well known by every body to be abſolutely neceſſary to ſupport life; and the alterations made in that fluid by rarefaction and condenſation, affect delicate and impaired conſtitutions, nay the moſt robuſt, at different times and ſeaſons, do not eſcape its effects; and may we not attribute many ſlight illneſſes, which being frequently renewed produce violent diſeaſes; to the conſtruction of many of our modern fitting rooms? particularly in large towns, where, the ſtudent that he may occupy as ſmall a ſpace of the houſe as poſſible, confines himſelf to a cloſe room; and the tradeſman brings himſelf and family to a ſmall apartment, for the conveniency of his employment.

The artiſt finiſhing the apartments is particularly attentive to make the door ſhut as cloſe as poſſible, and if he is not able to complete this to his

ſatisfaction

ſatisfaction, borders it round with liſt or ſome other contrivance to prevent the room from being called a cold one: The conſequence of this is, that, after the fire has been lighted for ſome time and people have breathed in it; the air is rendered too rare, from the want of a free admiſſion of freſh air. A perſon confined ſometime thus ſurrounded with ſuch a heated medium, will find, on a ſudden expoſure to the cold external air, diſagreeable effects, that may from frequent repetitions produce ſerious conſequences. And on the other hand, if the door or windows do not ſhut cloſe, ſtreams of cold air are pouring in upon us as we ſit near the fire, from every crevice or opening, in proportion to the magnitude and heat of the fire; which if not quite ſo deſtructive to the conſtitution as the former, is at leaſt, pernicious in a degree, and often produce ſevere illneſſes.

To prevent the ill effects of theſe cauſes I have contrived a tube, to be placed through the wall, in a corner or ſome other convenient part of the room, three or four inches from the ceiling.

(See fig. 1ſt.) A, the outer or external part, is broad like the bell part of a French horn, for the more eaſy admiſſion of the external air through B the tube, into C the elbow, the extremity of which is turned up to direct the admitted air to the ceiling; againſt which, it is reflected and diffuſed through the more rarefied air of the room, to keep up a proper equilibrium, without a ſtream or current of cold air, coming on any perſon in the room; the doors may then be made to ſhut cloſe by lifting or any more eligible contrivance of the mechanic; as a ſufficient ſupply of freſh air will be continually pouring through the tube, in proportion to the quantity of fire, without any inconveniency from its admiſſion.

Fig. 1ſt.

A lighted candle will not be affected by the air coming in this way, when held at the diſtance of ſix inches from the ſide of the tube, either above or below its extremity; though when held over the end of it, between that and the ceiling, it will be blown

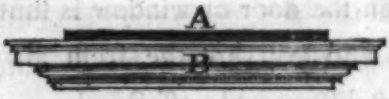
blown out with great force; when there is much fire in the chimney, and the door and windows close shut. If the door, or a larger opening than this tube, is open to the external air, it will not have that effect, as air always endeavours to force itself through every crevice 'till it has made an equilibrium; therefore if a large opening is made, from a door or window, this is done instantly, and the small openings have but little effect, but immediately when the door or window is shut, the tube acts again, and you breathe fresh air constantly without any disagreeable effects.

The wonderful effect air has in altering and changing of things, is evident to most people; and it is no less effectual in preventing chimneys from smoking, when a sufficient quantity is admitted. If the diameter of the orifice of the tube be insufficient for the admission of the air, a long narrow horizontal opening may be made near the ceiling, at the greatest convenient distance from the fire place, equal at least to the diameter of the smallest opening of the door or window, which is found to cause the ascent of the smoke up the chimney; in front of which opening, a slip of wood is to be placed,

placed, to direct its course to the ceiling, which may be ornamented like a cornice, or what best answers the appearance of the room.

(See fig. 2d.) A, the black line, representing the narrow slip cut through the wall.—B, the cornice, sunk down to shew the opening; which when in its proper place should be quite behind, and at the bottom part of the cornice.

Fig. 2d.



This will always answer where the opening of a door or window a little way is effectual, provided the inlet is equal to that of the door or window; and the air is best brought from the external part of the house from its most healthy situation. On this side of the house there should be no dunghill, ditch, or any accumulation of filth, that the atmospheric air, which we admit may be as pure as can conveniently be obtained, that being more dense than the internal air, which is loaded with phlogiston by breathing, burning of candles, and other phlogistic processes; and puts in motion the rarefied air within

within, and cauſes it to bend its courſe to the current up the chimney, made by the rarefaction of the fire, without letting in air in a cold ſtream on any perſon in the room, as is done by leaving a door or window a little open. By theſe means no more air will be admitted than is neceſſary for the purpoſe, and is conducive to health; thus the air that has ſerved for reſpiration is quickly diſcharged, as that which is moſt phlogiſticated is lighter than the reſt, and conſequently driven to the fire place, and there being more rarefied, it riſes in the funnel and goes out; the other air in the room flowing towards the chimney is likewiſe rarefied in its turn and carried away, ſo that there is a continual change of air without being incommoded, either with heated impure air, or cold ſtreams of air ruſhing into the room through every crevice or avenue; whereas, when tubes or pipes are fixed within the fire place, the air brought through them ſerves the current, and leaves the reſpired air within the room until it finds ſome outlet to make its eſcape by, conſequently we are obliged to breathe the ſame air, more frequently than in the other way of admittance.

FINIS.